Chapter 2
AREA DESCRIPTION AND RESOURCES

LOCATION AND FEATURES

The Northern Palm Beach County Planning Area (**Figure 1**) encompasses parts of five major surface water basins. These include the C-51, C-18, and L-8 canal basins, the City of West Palm Beach Grassy Waters Preserve, and the southern portion of the South Indian River Water Control District (SIRWCD). This area contains a mixture of residential, agricultural, and natural or undeveloped land uses. Three additional basins (the C-17 Canal Basin, eastern C-51 Basin, and Intracoastal Basin) lie to the east of the planning area and consist largely of urban, and commercial land uses. The planning area covers just under 200 square miles (approximately 115,000 acres). Historically, much of this landscape was covered with wetland marshes and swamps and flood-tolerant upland species such as pines and palmettos. Due to the flat, low-lying topography and relatively limited access to the sea, much of this area is poorly drained and prone to flooding.

The C-51 Canal Basin in central Palm Beach County is divided into eastern and western subbasins. The western subbasin consists primarily of residential and agricultural land uses. The eastern basin has urban, commercial and industrial uses including an international airport. Drainage from this basin discharges to tide through the C-51 Canal and the S-155 Structure into Lake Worth Lagoon.

The C-18 Canal Basin lies in northeastern Palm Beach County and includes residential and agricultural land uses as well as large tracts of natural wetlands in Loxahatchee Slough. Water from this basin drains northward to the Loxahatchee River.

The L-8 Canal Basin lies to the west of the C-18 and C-51 basins and east of the Everglades Agricultural Area (EAA). Most of the northern part of this basin is undeveloped wetlands and uplands in the J.W. Corbett Wildlife Management Area. The southern and eastern portions of the basin contain agricultural and low-density residential land uses. This basin drains primarily to the south into the western end of C-51 Canal.

The Grassy Waters Preserve is a large tract of wetlands that is owned and maintained by the City of West Palm Beach and serves as a surface water storage reservoir for public water supply. Water from this wetland is discharged to the east through the M-Canal to Lake Mangonia and Clear Lake, and subsequently enters the City's water treatment plant in West Palm Beach. Originally the Grassy Waters Preserve wetlands were connected through the C-51 Basin to the Everglades to the south. During very wet periods, water may have flowed from the Everglades to the Northwest Fork of the Loxahatchee River. General lowering of water levels due to drainage and construction of canals, levees and roads have significantly altered the hydrology of this basin. In the 1950s and 1960s, the Central and Southern Florida Flood Control Project compartmentalized the major wetlands and channeled flows through major canals toward the Lake Worth Lagoon. Today, the C-18 Basin is isolated from the larger Kissimmee-

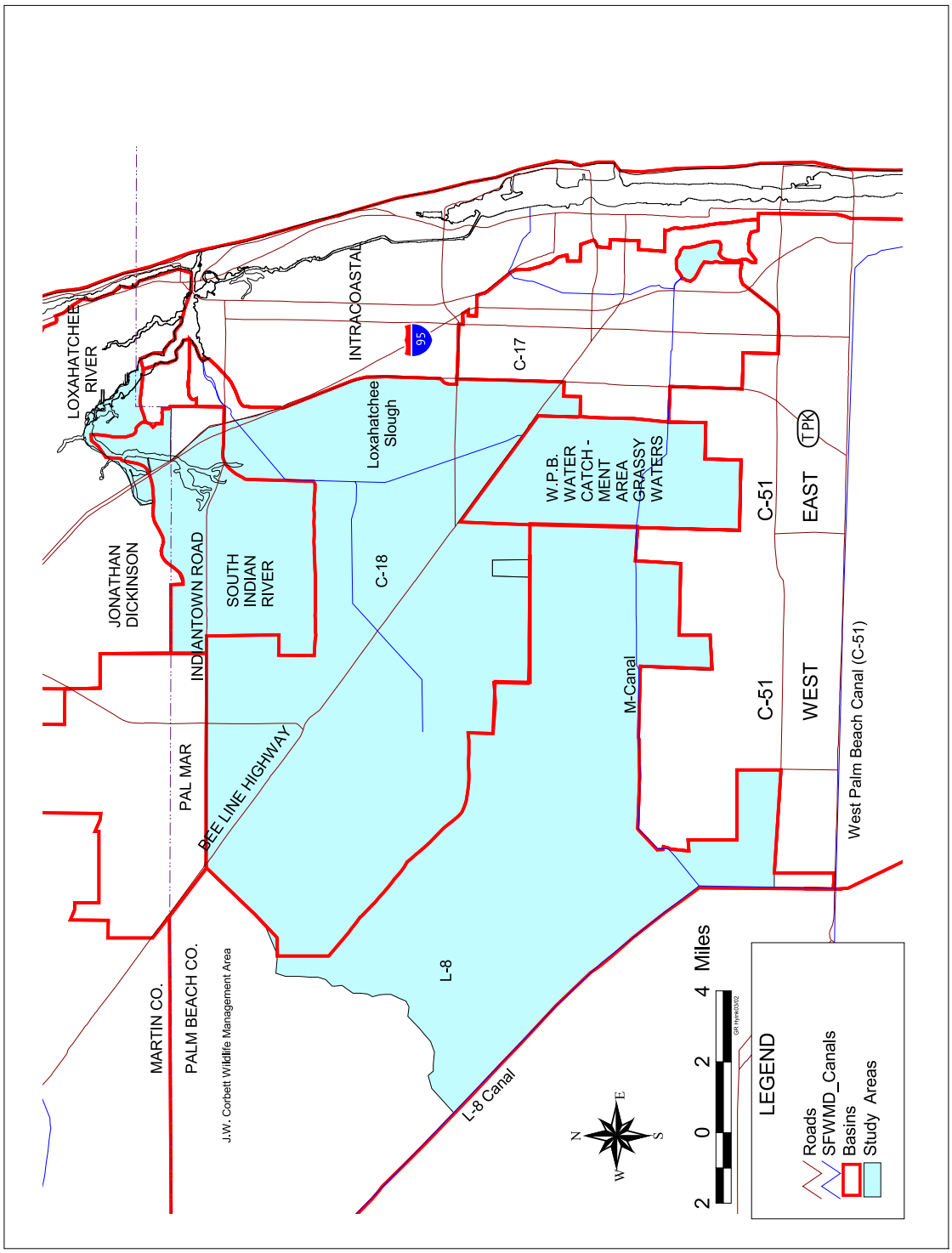

Figure 1. Locations and Boundaries of Hydrologic Subbasins in Northern Palm Beach County.

Okeechobee-Everglades hydrologic system. The Grassy Waters Preserve, located in the C-51 Canal Basin, receives water primarily from local rainfall; however, additional water can be delivered from Lake Okeechobee through the L-8 Canal and M-Canal.

Population, land development, and water use in the C-18 and C-51 basins have intensified rapidly during the past fifty years, resulting in loss of the natural water holding capacity of the land and increased competition for available water supplies within these basins. Water management issues associated with the Kissimmee-Okeechobee-Everglades region have further complicated the local management of surface water in the area. The need to provide more water for Everglades restoration has resulted in proposals to divert water from the L-8 Basin into Lake Okeechobee and the Everglades, thereby potentially removing water that might otherwise be available for use in the C-18 and C-51 basins. These actions stimulated local interests to work together to achieve common resource protection and management goals for the northern Palm Beach County area.

Palm Beach County is expected to experience significant growth between now and 2020, primarily in coastal areas. In the Northern Palm Beach County Planning Area, public water supply demands are projected to increase by 62 percent, from 82 mgd in 1995 to 128.6 million gallons per day (mgd) in 2020. In contrast, Palm Beach County agricultural water demands (excluding the EAA, which is located in western Palm Beach County, outside of the planning area) are projected to decrease 12 percent by 2020. Agricultural land use in northern Palm Beach County presently consists of approximately 4,000 acres of citrus, 1,600 acres of vegetables and 1,600 acres of pasture and turf. The total average annual demands are estimated as 7 mgd for citrus, 2 mgd for vegetables and 4 mgd for pasture and turf. No significant additional agricultural development is predicted to occur in northern Palm Beach County and large tracts of agricultural lands may be displaced in the future by urban development.

HISTORY

The following brief history is useful in understanding how this plan originated:

- The western C-51 Basin and southern L-8 Basin have historically had less than 1-in-10 year levels of flood protection due to lack of conveyance capacity in the C-51 Canal.
- Long-term sensitivity of the Everglades ecosystem to even low level nutrients precluded backpumping of C-51 waters to the Water Conservation Areas (WCAs). Backpumping into the WCAs requires substantial water quality pretreatment which adds considerable cost and makes backpumping less desirable as a solution to drainage in these flood-prone areas.
- Estuarine impacts created by high flows and poor water quality from C-51 Canal to the Lake Worth Lagoon have forced water managers to seek solutions other than discharge to tide through the C-51 Canal and S-155 to solve the problem of flooding in the western basins.

- Drainage of the C-18 Basin, the lack of a connection to the regional water management system, and construction of the Jupiter Inlet have contributed to a reduction in baseflow, and increased exchange with the ocean. These changes have caused saltwater intrusion to move further upstream in the Northwest Fork of the Loxahatchee River, a federally-designated Wild and Scenic River.
- The Everglades Protection Project (Burns and McDonnell, 1993, 1994) resulted in a reduction of the availability of regional water to water users in eastern Palm Beach County. This project proposed diverting water from the northern L-8 Basin into Lake Okeechobee to make up for additional evaporative losses associated with the stormwater treatment areas (STAs) in the Everglades Protection Area
- Continued drainage and development of the region's natural areas continues to reduce water storage and ground water recharge for traditional sources of public and agricultural water supply.

NEED FOR IMPROVEMENT

As a consequence of the historical events listed above, a consensus was reached among federal, state, regional and local water managers in the 1990's to move forward with a conceptual plan to impound surface water in three storage areas in the C-51 and L-8 basins. These storage areas would be linked together through existing canal systems and newly constructed pumps and water control structures. The backbone of the conveyance system would be the City of West Palm Beach's existing M-Canal, expanded to convey water to the Grassy Waters Preserve that is also a potable water supply source for the City of West Palm Beach.

Water in the vicinity of the Grassy Waters Preserve historically flowed north towards the Loxahatchee Slough during wet periods. However, flow barriers created by the berms associated with the preserve itself, the construction of Northlake Boulevard, and increased water demands by the City of West Palm Beach have reduced flow from the preserve to the Loxahatchee Slough and Loxahatchee River. The ability to enhance hydrologic conditions in the slough and river depends in part on moving additional water to and through the preserve.

The C-18 Basin, including the Loxahatchee Slough and contributions from the J.W. Corbett Wildlife Management Area, is a significant source of surface water flow to the Loxahatchee River and a minor source of water for ground water recharge to municipal wellfields in northern Palm Beach County. The Northwest Fork of the Loxahatchee River, a national Wild and Scenic River, has been impacted by both structural changes and drainage and development activities within the basin. Structural changes include dredging of the Jupiter Inlet (1947) and construction of the C-18 Canal (1950s). These changes have resulted in the substantial mortality of cypress trees and

upstream encroachment by mangroves within the lower portions of the river, downstream of river mile 8. There is less severe mortality in the central portions of the river, between river miles 8 and 12, where groundwater flows may protect cypress within, adjacent, and slightly away from the river's edge.

The exact nature and extent of the effects of saltwater intrusion on cypress habitat in the central portion of the river are difficult to assess due to several complicating factors. First, the remaining cypress trees are robust and may take several years before the effects of adverse conditions become visible. Second, flow conditions in the river vary considerably from year to year due to changes in rainfall. In addition, the threshold concentrations of salinity required to cause stress to, or kill, an individual cypress tree or seedling, have not been clearly defined.

By comparison, the cypress forest of the more saline lower portions of the Northwest Fork of the Loxahatchee River has died back during the past fifty years and been replaced by mangrove swamp. Existing and proposed water supply withdrawals in the C-18 Basin have therefore been modified through South Florida Water Management District (SFWMD) permits in an attempt to minimize further wetland impacts in the Loxahatchee Slough and Northwest Fork of the Loxahatchee River.

VISION OF WHAT IS NEEDED

The long-term vision is to hydrologically restore the Loxahatchee Slough so that it can support natural wetland plant and animal communities, provide a source of groundwater recharge for local water supply needs, and provide a source of supplemental water that can be delivered to the Northwest Fork of the Loxahatchee River. To successfully meet these management objectives, new or improved structural facilities and operational procedures must be provided to capture local runoff and convey more water into the slough. The need for a connection to the regional system through Grassy Waters Preserve is also identified as a critical requirement of the Northern Palm Beach County Comprehensive Water Management Plan (NPBCCWMP).

In addition to hydrologic restoration, control of exotic vegetation is of concern in the Loxahatchee Slough. Central wetland portions of the slough are infested with exotics (e.g., melaleuca and *Lygodium* sp.). Vegetation mapping by Erwin (1992) indicated that 645 acres or 12.4 percent of the central wetland portions of the slough were predominantly exotic vegetation.

This vision has been the impetus behind a commitment by the City of West Palm Beach to help formulate a sound, long-term subregional plan that optimizes surface water management for water supply, flood protection, and ecosystem management purposes. Since 1995, the SFWMD and the City of West Palm Beach have cooperatively funded this planning process and focused on developing a conceptual plan that identifies the needs of this unique area and the structural and operational improvements necessary to meet these needs. Computer models were developed to evaluate the relative benefits provided by each identified water management alternative. The identified needs and improvements

were communicated to both the Comprehensive Everglades Restoration Plan (CERP) and the Lower East Coast Regional Water Supply Plan (LECRWSP) and integrated into these planning processes.